

CHAPTER 2. RUNWAY DISTANCE REMAINING SIGNS

20. GENERAL. Runway distance remaining signs are used to provide distance remaining information to pilots during takeoff and landing operations.

21. DESCRIPTION. The signs are located along the side(s) of the runway, and the inscription consists of a white numeral on a black background, as shown in figure 22, to indicate the runway distance remaining in increments of 1,000 feet.

22. CONFIGURATION. The signs may be configured by either of three different methods, as illustrated in figure 23 and as described below. Displaced threshold areas which are used for takeoffs and/or rollout are treated as part of the runway for purposes of locating the signs. The method chosen should be based on cost considerations and adaptability to the specific airport configuration. When using the preferred method or alternate method #2 for runway lengths which are not an exact multiple of 1,000 feet, one-half of the excess distance is added to the distance of each sign on each runway end. For example, for a runway length of 6,500 feet, the excess distance is 500 feet and the location of the last sign on each runway end is 1,000 feet plus $1/2(500)$ or 1,250 feet. If a sign cannot be installed at its standard location, a tolerance of ± 50 feet is allowed for that sign. The sign should be omitted if it cannot be installed within this tolerance.

a. Preferred Method. The most economical installation consists of double-faced signs located only on one side of the runway. Where this method is used, the signs should be placed on the left side of the runway as viewed from the most often used direction. However, the signs may all be placed on the right side of the runway where necessary due to runway/taxiway separation distances or because of conflicts between intersecting runways or taxiways.

b. Alternate Method #1. This method uses single-faced signs installed on both sides of the runway. The advantage of this method is that the runway distance remaining can be

more accurately reflected in cases where the runway length is not an exact multiple of 1,000 feet.

c. Alternate Method #2. This method uses double-faced signs installed on both sides of the runway. The advantage of this method is that runway distance is displayed on both sides of the runway which is particularly advantageous when a sign on one side has to be omitted because of a clearance conflict.

23. OPERATION. The sign system should be designed so that they are illuminated at all times the runway edge lights are illuminated.

24. SIGN SELECTION. Signs should be in accordance with AC 150/5345-44, *Specification for Taxiway and Runway Signs* (current edition), type L-858B, size 4 (48-inch sign face with a 40-inch legend) or size 5 (30-inch sign face with a 25-inch legend). The signs should be of the same size on any particular runway. The choice of a size involves several factors such as effectiveness, aircraft clearance, jet blast, and snow removal operations. Normally, the larger the sign and the closer it is located to the runway or taxiway edge, the more effective it is. However, aircraft clearance requirements and jet blast effects require smaller signs when located near the pavement edges, whereas, effectiveness requires larger signs when located at further distances. Also, the effects of snow removal operations on the signs should be considered in the choice of sign size and location. The sign should provide 12 inches of clearance between the top of the sign and any part of the most critical aircraft using, or expected to use, the airport when the aircraft wheels are at the pavement edge.

25. INSTALLATION. The signs should be located with respect to the runway in accordance with table 4 and installed in accordance with paragraph 16.



Figure 22. Typical Runway Distance Remaining Sign



NOTES

1. EXAMPLES **BASED** ON A 6500 FOOT RUNWAY.
2. SIGNS LESS THAN 1000 FT. FROM TAKEOFF END, AS **INDICATED** BY ASTERISKS IN ALTERNATE METHOD #1, MAY **B E** **OMITTED**.

Figure 23. Runway Distance Remaining Sign Configurations

Table 4. Location Distances for Runway Distance Remaining Signs				
Sign size	Sign heights [in. (cm)]			Distance from defined pavement edge [ft. (m)]
	Legend	Face	Installed (max.) *	
4	40 (100)	48 (120)	60 (152)	50-75 (15-22.5)
5	25 (64)	30 (76)	42 (107)	20-35 (6-10.5)

* The height referred to in this column is the distance from top of the sign to grade measured at the side of the sign that is nearest to the applicable runway. In accordance with paragraph 13 this height should be reduced, if necessary, to provide the required 12-inch clearance between the top of the sign and the critical aircraft.

APPENDIX 1. AIRPORT SIGNING EXAMPLES

1. GENERAL. This appendix depicts examples of signs that would be installed on various airport configurations. To understand why some signs are included in this system while others are omitted, it is important to understand the functional layout of each of these airports. For this reason, we have provided a brief description of the airport with each example, as well as a brief rationale on why certain signs were installed or omitted. The intent of these examples is to illustrate that the types and locations of the signs included in an airfield sign system reflect a determination made by the airport operator in consultation with the users and the FAA.

2. EXAMPLE 1. Figure A-1 depicts a taxiway guidance sign system for a portion of a complex airport. The airport serves both domestic and international air carriers, as well as general aviation, and has an air traffic control tower. The apron area shown at the south of the figure is for air carriers with the international terminal being located on the eastern end of the apron. The two high speed exits (D and E) have centerline lights. All the other taxiways have edge lights. Taxiway G leads to fixed-base operator facilities. Taxiway H leads to corporate hangars and an air carrier maintenance hangar. The intersection of Taxiways C, G, and H, and Runway 9-27 represents a major crossing point for aircraft travelling between the north and south areas of the airport. It is also commonly used by general aviation aircraft for intersection departures. Taxiway holdline markings are shown on the taxiways where a pilot will normally be requested by air traffic control to hold because of traffic on an intersecting taxiway. With this background, let's review the signs included in this system:

- o Holding position signs along with taxiway location signs are installed on all taxiways that intersect the runway.

- o Taxiway B passes through the ILS critical area so an ILS holding position sign is also necessary on this taxiway since the critical area is not within the area protected by the standard runway holdline.

- o On Runway 9, exit signs are shown for Taxiways C, E, G, and H, since aircraft using this runway would normally use these taxiways as exits. On Runway 27, exit signs are shown for Taxiways B, C, D, G, and H, since aircraft using this runway would normally use these taxiways as exits. The exit signs for

Taxiways D and E are installed in accordance with the guidance provided in paragraph 7b(2) and 7b(3). It should also be noted that for the Runway Exits G and H, the G is placed first in the sign array in accordance with paragraph 12f which establishes the clockwise convention for direction signs within an array beginning from the taxiway or runway where the aircraft is located.

- o Taxiways D and E are both high speed exits that are equipped with centerline lights. Since these lights are color coded, runway safety area/OFZ boundary signs are not needed on these taxiways even though air traffic control commonly asks pilots to report when they are clear of the runway. Also, since an aircraft would not normally use these taxiways as an entrance to the runway, it is not necessary to install direction signs for them on Taxiway B.

- o Pilots of air carrier aircraft that use Taxiway C as an exit are commonly asked by air traffic control to report when they are clear of the runway. To assist the pilot in judging when he/she is clear of the runway, a runway safety area/OFZ boundary sign has been installed on the back of the hold position sign on Taxiway C.

- o Pilots exiting the runway on Taxiway B during instrument meteorological conditions are asked to report clear of the ILS critical area. An ILS critical area boundary sign is included on the back of the ILS holding position sign to identify the perimeter of the critical area, since this taxiway is not equipped with color coded centerline lights.

- o Taxiway direction signs are placed only at the intersections for the taxiways on which the pilot would normally turn. As an example, look at the intersection of Taxiways B, E, and F.

- o On Taxiway B, direction signs are provided only for Taxiway F, since an aircraft would not be expected to turn onto Taxiway E.

- o On Taxiway E, direction signs are provided for both Taxiways B and F, since an aircraft could be expected to turn onto any of these taxiways.

- o On Taxiway F, a direction sign is provided only for Taxiway B, since an aircraft would not normally proceed from Taxiway F onto Taxiway E.

- o Taxiway direction signs for Taxiways G and H have been provided on the north side of the runway to provide guidance to pilots crossing the runway from Taxiway C. Location signs have also been placed on the back of the holding position signs on these two taxiways so that the pilot can confirm what taxiway he/she has chosen. A direction sign has not been provided for Taxiway C since pilots crossing from Taxiways G and H have one choice. A location sign has been added to the back of the runway hold position sign to confirm to the pilot that he/she is on Taxiway C.

- o Aircraft departing the apron on Taxiways C and F arrive at these taxiways from various directions depending upon their gate position. Some aircraft approach these taxiways by taxiing along the edge of the apron, while others approach these taxiways straight on. Direction signs have been placed on the edge of the apron for the former case while location signs have been installed on these taxiways for the latter case.

- o In the past, the airport has had problems with international airline pilots getting lost as they taxied to the international terminal. For this reason, the air traffic control tower developed a preferred routing for these pilots. The airport operator has decided to install destination signs to indicate this preferred routing in addition to the taxiway direction signs. The location of three of these signs deserve further mention. The two destination signs that indicate the international terminal is straight ahead are located on the far side of the intersection on the right side of the taxiway. This is permissible in accordance with the signing conventions provided in paragraph 12c(5). The destination sign at the intersection of Taxiway B and D is located on the far side of the intersection even though it indicates a turn. This is permissible in accordance with the signing conventions provided in paragraph 12j since Taxiway D ends at this intersection, and taxiway direction signs are provided on Taxiway D prior to the intersection.

3. **EXAMPLE 2.** This example (see figure A-2) involves an airport with two intersecting runways. The main runway, 9-27, is 8,500 feet in length while the crosswind runway, 18-36, is 5,000 feet in length. The air carriers use only Runway 9-27, while the commuters and general aviation use both runways. The air carrier and commuter terminal is on the south side of the airport, while all the general aviation facilities are located on the north side. The airport has an air traffic control tower. When general aviation aircraft are landing on Runway 9, air traffic control will often ask

them to hold short of Runway 18-36 so that it can be used for a general aviation departure.

With this background, let's review the signs included in this system:

- o Holding position signs along with taxiway location signs are installed on all taxiways that intersect the runways. Even though it is possible to cross the runway at the thresholds for Runway 27 and Runway 36, a sign with only one runway designation is installed at each of the hold positions located on these taxiways. Since air traffic does not use these taxiways to cross these runways, there is not an operational need to have two runway destinations on these signs. (See paragraph 5a).

- o Holding position signs have been installed at the intersection of the two runways. Since Runway 9 is used for "land, hold short" operations, two signs are installed at its intersection with Runway 18-36.

- o Exit signs are installed for the taxiways where aircraft normally exit. For Runway 9, exit signs have been installed at Taxiways D, F, G, and A. Since Taxiway F crosses this runway, it is necessary to install an exit sign on both the left and right side of the runway. For Runway 27, exit signs are installed on Taxiways A, B, C, and D. Exit signs are installed on Runways 18 and 36 at Taxiway A, as well as at the runway ends.

- o Because of the straightforward layout of this airport, the airport operator in conjunction with the users and FAA determined that taxiway direction signs were only needed at two intersections. This airport's configuration requires the majority of the aircraft to taxi through or turn at the intersection of Taxiways A and F. For this reason, direction signs and the associated location sign were installed on each leg of this intersection. A direction sign was also installed on Taxiway E at its intersection with Taxiway A. Since the left side of Taxiway E is contiguous with the air carrier apron at this point, the sign is installed on the right side of Taxiway E.

- o A location sign is installed on Taxiway A where it leaves the west side of the air carrier apron. A similar sign is not included on the east side, since the location sign installed with the runway holding position sign is sufficient to provide the location information to the pilot. A location sign is installed on Taxiway E where it leaves the air carrier apron. Location signs have also been installed on Taxiways F and G where they leave the general aviation apron.

- o It was determined that there was no need to install runway safety area/OFZ boundary signs on this airport.

4. EXAMPLE 3. This example (see figure A-3) involves an airport with a single runway and parallel taxiway. The runway is 4,500 feet in length. The airport does not have an air traffic control tower. The apron serves both general aviation and the scheduled commuter.

With this background, let's review the signs included in this system:

- o Holding position signs along with taxiway location signs are installed on all taxiways that intersect the runway.

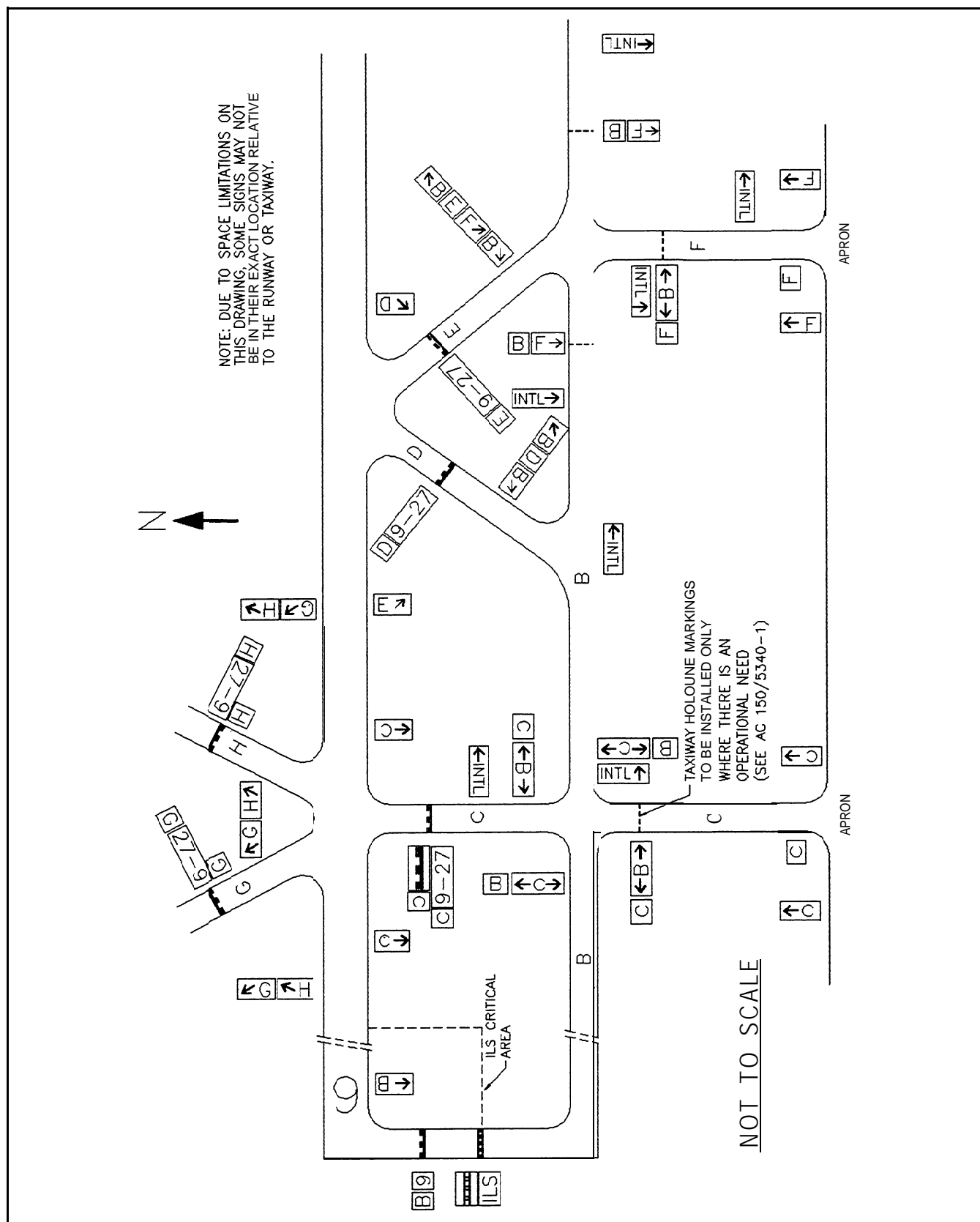
- o Exit signs have been installed for both runway directions at Taxiways B and D, as well as at the end of each runway for Taxiway A.

- o Direction signs for Taxiway A have been installed at the intersections of Taxiways B, C, and D. Direction signs for Taxiway C have also been installed on Taxiway A. (Note: Since this airport does not have a control tower, an analysis could have concluded that it was advantageous to install destination signs in lieu of direction signs.) Location signs have not been

installed as part of the direction sign arrays, since, in the case of Taxiways B and D, location signs were installed on the back of the runway holding position array. For the intersection of Taxiways A and C, it was determined by the airport operator in conjunction with the users and the FAA that location signs were not needed since this location should be obvious to the pilot. This determination was based upon the relatively simple configuration of this airport and the fact that there is only one parallel taxiway and one apron with a single taxiway providing access to it.

- o Location signs have been placed along Taxiway A for aircraft taxiing from the runway ends towards the terminal.

- o An outbound destination sign for the runway ends has also been placed at the intersection of Taxiways A and C. Since this is a "T" intersection and direction signs are provided prior to the intersection, it is permissible to install this sign on the far side of the intersection (see paragraph 12j). The face of this sign merits further discussion. The runway numbers are separated by a vertical border rather than a dash since this is a destination sign. In this case, each runway designation and its associated arrow is considered to be a separate panel and, therefore, separated by a vertical border (see paragraph 12l).



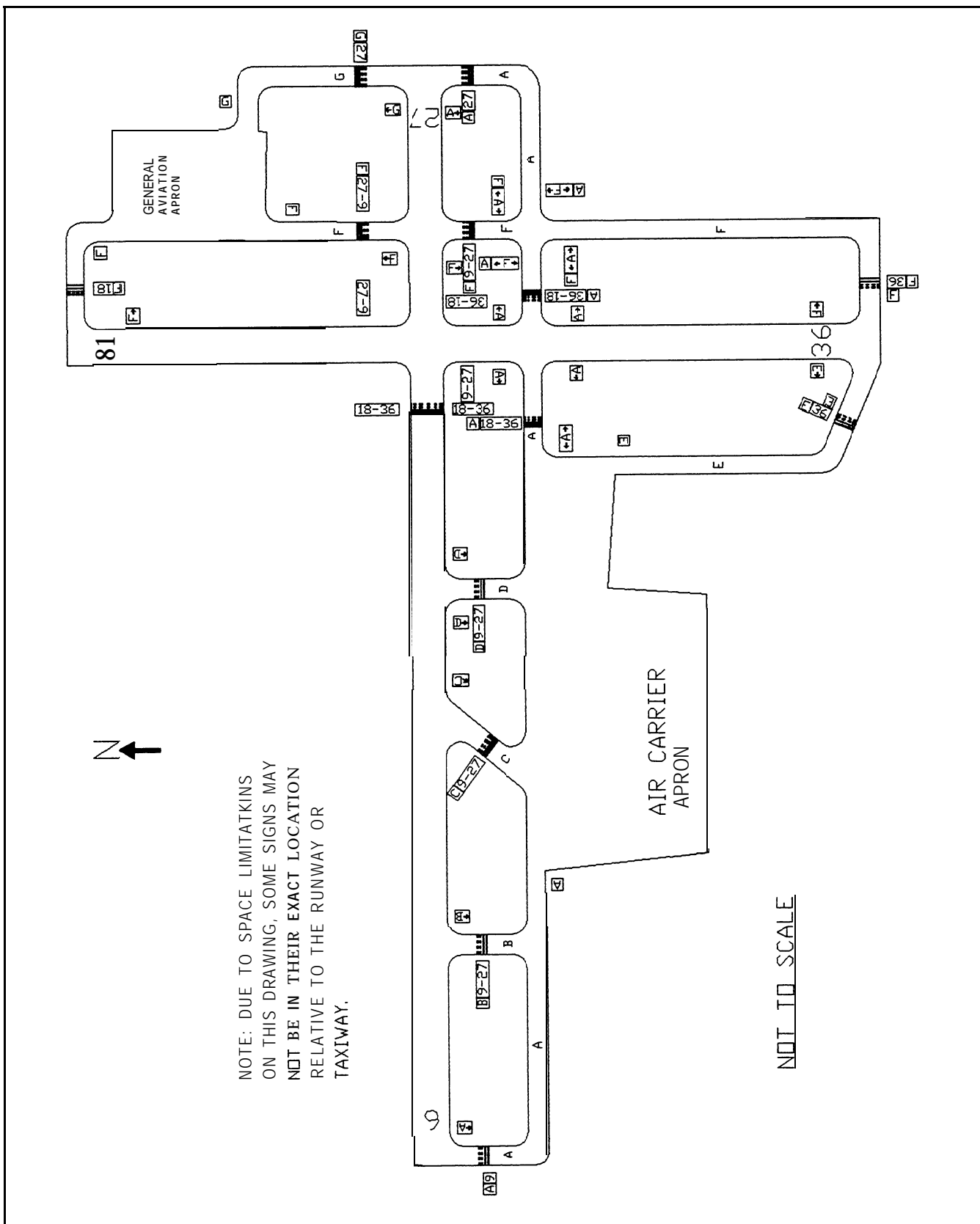


Figure A-2. Signing Example for Airport with Two Intersecting Runways

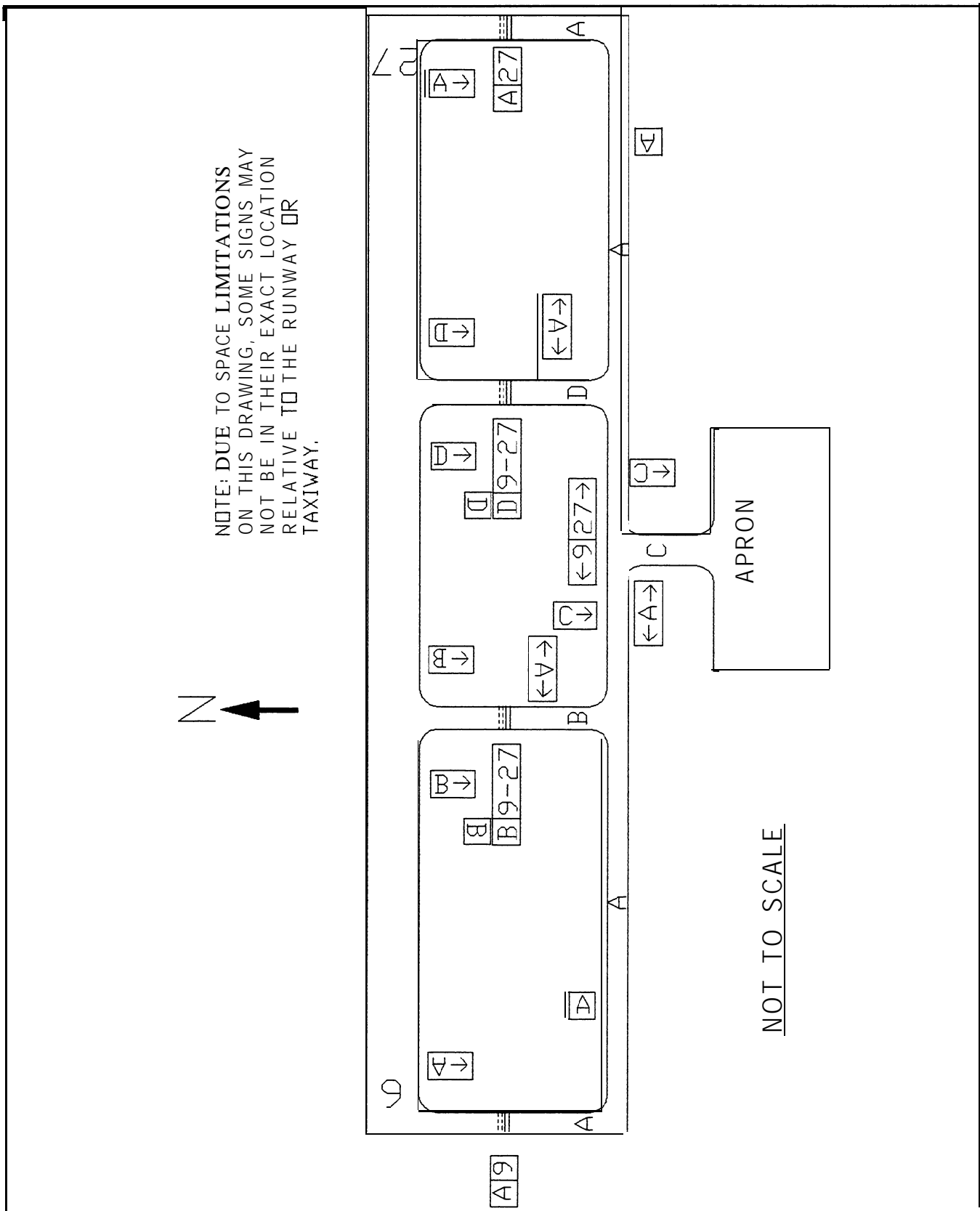


Figure A-3. Signing Example for an Airport with a Single Runway

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